

CLAIMS

1. A fully variable hydraulic valve drive comprising a hydraulic drive unit which is acted upon with hydraulic fluid for opening and closing a valve wherein the drive unit of the valve in the closing or opening stroke movement acts on an intermediate storage means with hydraulic fluid under pressure, wherein this hydraulic fluid which is stored under pressure in the intermediate storage means then drives the drive unit of the valve again in the opposite stroke movement.

2. A valve drive as set forth in claim 1 wherein the valve is accelerated and decelerated in the opening or in the closing stroke movement or in both stroke movements in the form of a free oscillator.

3. A valve drive as set forth in claim 2 wherein a control valve holds the valve fast in the opened and closed condition.

4. A valve drive as set forth in claim 1 wherein an opening or a closing stroke movement or both movements of the valve is or are effected in a hydraulic system which is closed in that time interval and which comprises an intermediate storage means, a drive unit of the valve, and a control valve.

5. A valve drive as set forth in claim 1 wherein the valve drive drives inlet or exhaust valves or both types of valves.

6. A valve drive as set forth in claim 1 wherein the stroke travel of the valve is adjustable.

7. A valve drive as set forth in claim 1 wherein compensation for the losses caused by friction and leakage is effected by make-up supply of pressurised hydraulic fluid from a supply line.

8. A valve drive as set forth in claim 1 wherein the opening and closing moment of the valve is freely controllable.

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9. A valve drive as set forth in claim 1 wherein the stroke movement of the valve is controlled by the filling pressure obtaining in the intermediate storage means in the closed condition of the valve.

10. A valve drive as set forth in claim 1 wherein the opening time of a control valve regulates the filling pressure of the intermediate storage means in the closed condition of the valve.

11. A valve drive as set forth in claim 1 wherein the setting values are stored in dependence on various influencing parameters.

12. A valve drive as set forth in claim 11 wherein the influencing parameter is the temperature of the oil or the temperature of the cylinder head or the boost condition or a combination thereof.

13. A valve drive as set forth in claim 1 wherein when the valve is closed filling pressure obtains in the intermediate storage means.

14. A valve drive as set forth in claim 1 wherein the valve is opened by means of the filling pressure obtaining in the intermediate storage means.

15. A valve drive as set forth in claim 1 wherein the drive unit of the valve is in the form of a differential cylinder.

16. A valve drive as set forth in claim 15 wherein the supply pressure obtains in the right-hand cylinder chamber of the differential cylinder.

17. A valve drive as set forth in claim 1 wherein the drive unit of the valve is in the form of a cylinder with a spring return or in the form of a plunger cylinder.

18. A valve drive as set forth in claim 1 wherein the intermediate storage means is in the form of a volume representing a hydraulic capacitance.

19. A valve drive as set forth in claim 1 wherein the storage means is in the form of a volume representing a hydraulic capacitance.

20. A valve drive as set forth in claim 1 wherein the intermediate storage means is in the form of a gas-filled hydraulic storage means or in the form of a diaphragm or a balloon or a piston storage means or in the form of a combination thereof.

21. A valve drive as set forth in claim 1 wherein the storage means is in the form of a gas-filled hydraulic storage means or in the form of a diaphragm or a balloon or a piston storage means or in the form of a combination thereof

22. A valve drive as set forth in claim 1 wherein measurement of the position of the engine valve is effected inductively or optically or capacitively or by pressure measurement in the intermediate storage means or in the storage means or in the chamber.

23. A valve drive as set forth in claim 1 wherein a pressure pick-up measures the pressure obtaining in the intermediate storage means or the storage means or in the chamber.

24. A valve drive as set forth in claim 1 wherein the hydraulic drive unit is a piston cylinder unit.

25. A valve drive as set forth in claim 1 wherein the valve drive is acted upon with hydraulic fluid for opening and closing a valve of an internal combustion engine.

26. A fully variable hydraulic valve drive comprising at least one control valve and a hydraulic drive unit which is acted upon with hydraulic fluid for opening and closing a valve wherein the drive unit of the valve in the closing or opening stroke movement acts on an intermediate storage means with hydraulic fluid under pressure wherein the control valve or valves is or are switched only when the hydraulic fluid volume flow flowing therethrough is less than 20% of the maximum volume flow flowing therethrough.

27. A valve drive as set forth in claim 26 characterised in that the control valve or valves is or are switched only when the hydraulic fluid volume flow flowing therethrough is less than 10% of the maximum volume flow flowing therethrough.

28. A valve drive as set forth in claim 26 wherein when the valve is closed filling pressure obtains in the intermediate storage means.

29. A valve drive as set forth in claim 26 wherein the valve is opened by means of the filling pressure obtaining in the intermediate storage means.

30. A valve drive as set forth in claim 26 wherein the drive unit of the valve is in the form of a differential cylinder.

31. A valve drive as set forth in claim 30 wherein the supply pressure obtains in the right-hand cylinder chamber of the differential cylinder.

32. A valve drive as set forth in claim 26 wherein the drive unit of the valve is in the form of a cylinder with a spring return or in the form of a plunger cylinder.

33. A valve drive as set forth in claim 26 wherein the intermediate storage means is in the form of a volume representing a hydraulic capacitance.

34. A valve drive as set forth in claim 26 wherein the storage means is in the form of a volume representing a hydraulic capacitance.

35. A valve drive as set forth in claim 26 wherein the intermediate storage means is in the form of a gas-filled hydraulic storage means or in the form of a diaphragm or a balloon or a piston storage means or in the form of a combination thereof.

36. A valve drive as set forth in claim 26 wherein the storage means is in the form of a gas-filled hydraulic storage means or in the form of a diaphragm or a balloon or a piston storage means or in the form of a combination thereof.

38. A valve drive as set forth in claim 26 wherein a pressure pick-up measures the pressure obtaining in the intermediate storage means or the storage means or in the chamber.

40. A valve drive as set forth in claim 26 wherein the valve drive is acted upon with hydraulic fluid for opening and closing a valve of an internal combustion engine.